

Chapter 4

RECOMMENDED DEVELOPMENT PLAN

This chapter presents estimates of facility requirements for Byron to accommodate the forecast aviation demand presented in Chapter 3, and a recommended development plan to accommodate these facility requirements. The results of an environmental review of the recommended development plan are also included. Any development on the premises of the Byron Airport, including aviation and non-aviation development, shall comply with the Contra Costa County Airport Land Use Commission's *Airport Land Use Compatibility Plan* for the Byron Airport that is in effect at the time the development is proposed, and shall be subject to the applicable *Airport Land Use Compatibility Plan* land use compatibility zones in which the development occurs.

FACILITY REQUIREMENTS

Airport requirements were derived from an assessment of existing conditions and demand/capacity evaluations for major Airport components. The following summarizes requirements for the airfield, navigational aids, general aviation (including increased corporate activity), airport support, ground access, and utilities. Recognizing uncertainties associated with forecasts of long-range aviation demand, two planning scenarios were identified to represent future levels of activity at which key airside and landside improvements would be triggered. For this Master Plan, the "near-term" planning scenario corresponds to the 2008-2010 time frame, and the "long-term" planning scenario corresponds to the 2023-2025 time frame.

Airfield

Runway capacity is defined as the maximum number of aircraft operations that can take place on a runway system in an hour given weather conditions, fleet mix, and air traffic control procedures. Runway capacity can also be expressed in terms of annual service volume (ASV) using the methodologies outlined in FAA Advisory Circular (AC) 150/5060-5, *Airport Capacity and Delay*. ASV provides a reasonable estimate of annual capacity that accounts for differences in aircraft mix, runway use, and weather conditions that would be encountered during the year. Byron's ASV is estimated at 270,000 aircraft operations.

Annual operations at Byron are forecast to increase from approximately 40,000 in 2003 to 64,200 under the long-term planning scenario. Thus, Byron has sufficient airfield capacity to accommodate forecast aviation activity, including flight training, throughout the planning period.

Byron's current taxiway system, including full-length parallel taxiways to Runway 12-30 and Runway 5-23, provides access to all runway ends. No additional parallel taxiways are necessary in the planning period.

Navigational Aid Requirements

As discussed in Chapter 2, there is a GPS approach to Runway 12-30, which allows straight-in landing approaches down to a decision height (DH)* not lower than 740 feet and visibility not less than 1 mile. At Byron, the occurrence of IFR weather conditions (ceiling less than 1,000 feet and visibility less than 3 miles) is particularly high during December and January. To reduce the frequency of diverted flights during inclement weather and better accommodate potential Airport users, (e.g., increased corporate jet activity), it would be prudent to ultimately provide an instrument landing system at the Airport with lower decision height and visibility requirements.

General Aviation Facility Requirements

General aviation facility requirements were based on a review of existing facilities, market requirements, field observations, discussions with Airport tenants, and forecast data provided in Chapter 3, as well as Byron's intended future role. Analysis of the range of general aviation activity generated the following facility requirements.

Fixed Base Operators (FBOs). There are currently no FBOs at Byron Airport. Requirements for FBOs are normally demand-driven, and/or based on the range (or lack) of services offered by aviation service providers. For instance, some small general aviation airports accommodate multiple FBOs, each providing a limited number of services; on the other hand, many airports with more general aviation activity than Byron have only one full-service FBO. In general, it can be assumed that 50,000 annual general aviation operations can support one FBO—consequently current demand is close to supporting the need for a full-service FBO. Three acres is considered a sufficient surface area to support a medium-sized fixed base operator, including itinerant apron, hangar, office and car parking space. Space should be reserved for at least one FBO development.

Base Aircraft Storage Facilities. As discussed in Chapter 3, the number of based aircraft at Byron is expected to increase throughout the planning period. Based on the mid-point demand forecast, it is estimated that there would be a requirement for two additional 30-aircraft row hangar or T-hangar developments,

*DH is the lowest height above the runway end at which a pilot must decide whether to continue the approach or execute a missed approach.

each of about 1.3 acres (110,000 square feet). With higher demand conditions, more hangars could be required.

In addition to hangar space for aircraft storage, hangar space for general aviation-related activities and business enterprises should also be provided. These activities include, but are not limited to, aircraft maintenance and repair, aircraft sales and leasing, avionics maintenance and sales, fueling for jet aircraft, and aviation-related office space. Requirements for aviation support hangars are market driven, and will be constructed by the County or third-party service providers based on market demand.

Airport Support Facility Requirements

Support facilities include fuel storage and airport administration and operations. Requirements are based on field observations, discussions with Airport staff, and facilities at similarly sized airports.

Fuel Storage Facilities. It is anticipated that AvGas fuel storage required for general aviation piston aircraft operations can be accommodated by the existing airport fuel storage system. There are currently no public fueling facilities for jet aircraft.

Airport Administration and Operations. Airport administration and operations functions are accommodated in the 2,400 square-foot Administration Building. Requirements for administrative facilities depend on the number of administrative functions provided at Byron, rather than activity levels, while requirements for operations facilities are dependent on the number of employees. Based on the forecast level of aviation activity, it is anticipated that the existing facility will accommodate Airport administration through the end of the 20-year planning period.

Ground Access Requirements

Roadway requirements to serve planned Airport facilities include a roadway system that accommodates anticipated growth in general aviation activity and addresses current access issues. Recommended roadway improvements include (1) direct access to the general aviation areas, and (2) a continuous roadway along the landside of proposed facilities.

Utilities

It is estimated that the various Airport utility systems can accommodate existing development with the **current** utilization of facilities. However, a significant increase in utilization of existing facilities or even limited expansion of facilities (e.g., an additional 30-aircraft hangar or a small FBO) may require additional utilities development. The potential sources of additional utilities, and the general infrastructure required to make them available at the Airport, are summarized in this section. Figure 4-1 summarizes potential utilities connections and outlines necessary infrastructure requirements.

It should be noted that the following requirements are preliminary in nature, based on informal discussions and other information obtained from the various utility providers in the area. As implementation of the Development Plan proceeds, formal discussions should be held with the utility providers so that the needed improvements can be engineered and cost estimates generated. Both the water supply and sewer discharge issues will likely require discussion and approval by LAFCO to define and/or confirm the boundary of any water and sanitation district.

Upgrading the current connection at Holey Road can provide additional **electrical power** to the Airport. As it has not been determined whether the current utility joint trench has additional conduits to accommodate the upgrade, PG&E should be consulted once additional power requirement are determined to be necessary.

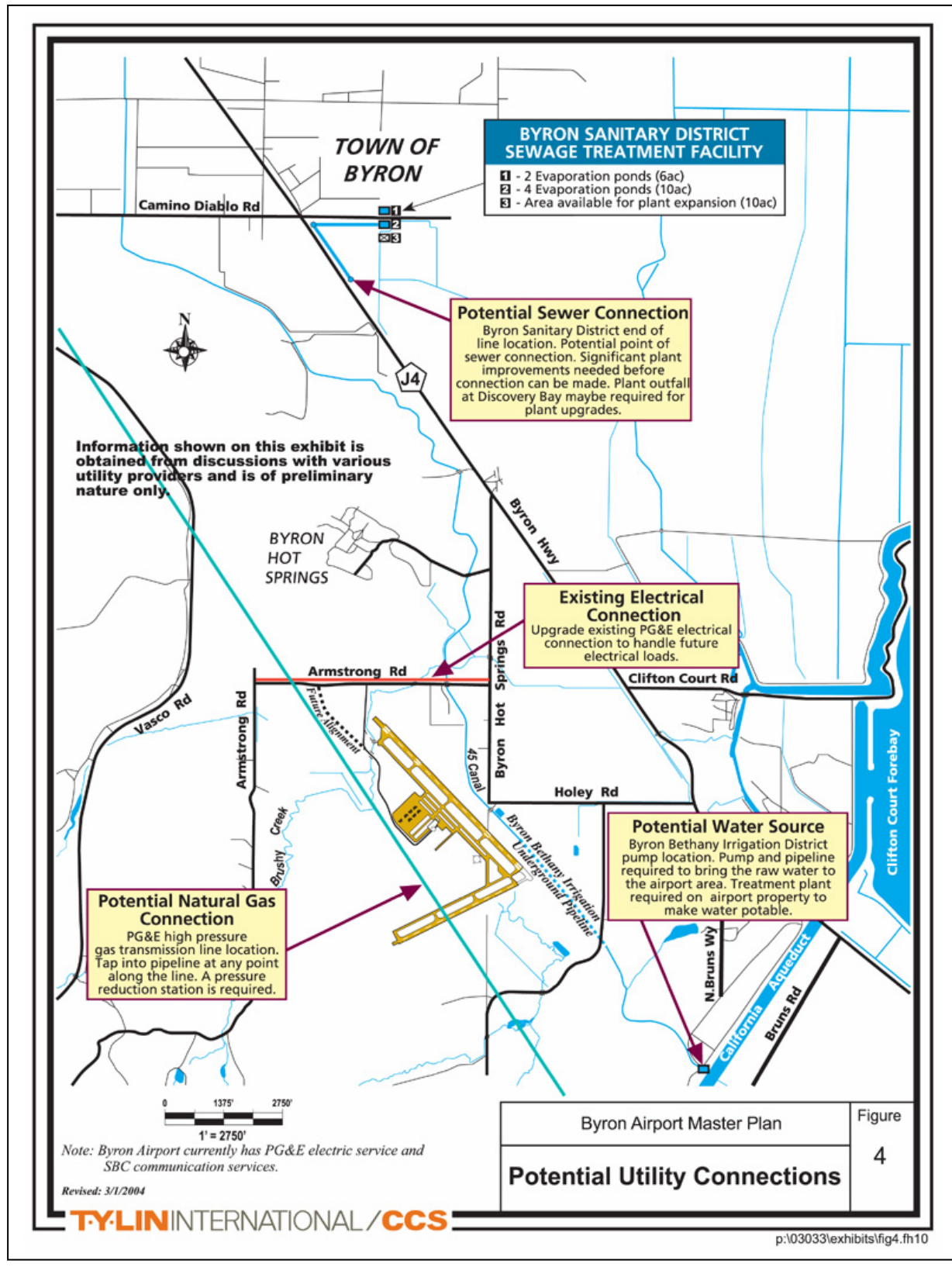
Any significant development will likely require the provision of **natural gas** to the airport area. PG&E indicated that they would be able to provide natural gas service by tapping into their high-pressure transmission line that crosses Runway 5-23. A pressure reduction station will have to be constructed within the airport area.

The current **water** system provides limited fire protection to major structures. Any significant development will likely require both potable water and additional fire flow capacity to provide a minimum level of fire protection for major structures. The nearest water provider is the Byron-Bethany Irrigation District, which currently provides untreated raw water in the months of March through October to the Byron area. The District has indicated that it has the ability to provide year-round raw water to the Airport. However, there will be a need to construct a pump station at the California Aqueduct and a system of pipelines to convey the water to the Airport. There will also be a need to provide a water treatment plant, booster pumps and separate water tanks for potable and fire water at significant cost. Additional land may be needed to construct these facilities.

Given the limited available information on Airport utilities, and the uncertainty regarding the timing of future development (such as facilities for an FBO), it is recommended that a utilities/infrastructure master plan be prepared.

Figure 4-1

POTENTIAL UTILITY CONNECTIONS



As the water supply is upgraded, it will be necessary to provide a reliable **sewer** connection, rather than rely on the existing sewer leach fields. The nearest sanitation district is the Byron Sanitary District, which operates a zero-discharge sewer treatment facility on Camino Diablo. A connection can be made to the District's existing sewer line on Byron Highway. As the facility has limited capacity, the additional sewer discharge will require the District to upgrade their facility at significant cost.

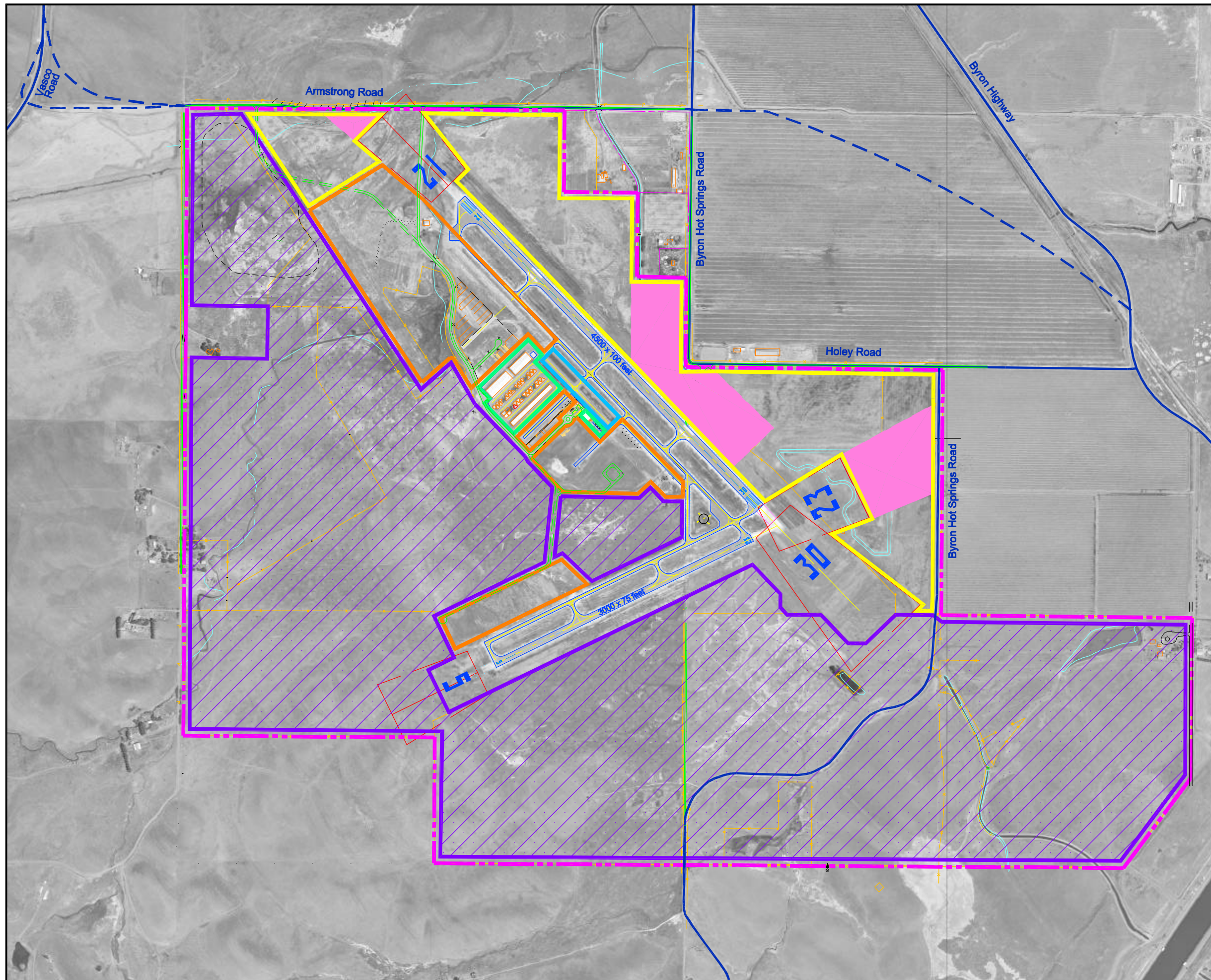
Additional **communications** cables can be provided along the same route as the electrical cables. SBC Communications should be consulted once the need for additional communications equipment is established, as there may be a need to install a switch, depending upon the needs of the future tenants.

RECOMMENDED DEVELOPMENT PLAN

Long-term land uses for Byron Airport, reflecting the Recommended Development Concept, are depicted on Figure 4-2. The major findings and conclusions of the master planning process include:

- General aviation facilities should generally remain in their current locations to maximize previous investments and capitalize on existing development patterns.
- Airport support functions (e.g., administration, operations and maintenance) should continue to be centralized and located contiguous to the Air Operations Area (AOA).
- Parcels that include infrastructure (utilities, roads, etc.) but are not located adjacent to the AOA should be reserved for land uses that may provide revenue-generating opportunities for Contra Costa County.
- Existing airport access via Falcon Way should be improved/upgraded to satisfy runway approach and safety area requirements. In the long term, improved ingress/egress should be provided via the Armstrong Road connection to Vasco Road.
- No land acquisition is necessary to support the Recommended Development Concept. However, the County should acquire property to ensure protection of approach and safety areas.

Recommended airfield facilities, landside facilities, and land uses are discussed in the following sections.



- LEGEND**
- Airport boundary
 - Aircraft storage facilities
 - Aircraft parking
 - Reserved for aviation-related uses
 - Reserved for airport related uses (secondary area)
 - ▨ Biologically sensitive habitat
 - Reserved for airport-related uses
 - Off-airport road
 - - - Potential off-airport road development
 - - - Proposed on-airport road
 - On-airport road

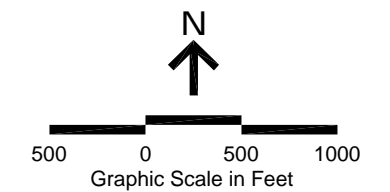
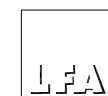


Figure 4-2
RECOMMENDED DEVELOPMENT PLAN

Byron Airport
November 2004



LEIGH FISHER ASSOCIATES

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Recommended Airfield Facilities

No changes to the runways are anticipated in the 20-year planning period. Taxiways and additional apron to support general aviation hangar development may be required to enhance the long-term operational flexibility of the Airport.

Strategic Recommendation. The strategic recommendation to ultimately extend Runway 12-30 to 6,000 feet and Runway 05-23 to 3,900 feet is based on the premise that, for the Airport to be better accommodate corporate jet activity, the runway system should provide an even greater degree of operational flexibility than the current runway lengths provide. By extending the length of Runway 12-30 to 6,000 feet, and the length of Runway 5-23 to 3,900 feet, the runway protection zones would essentially remain within the current Airport boundary.

Recommended Landside, Access, and Circulation Facilities

With regard to landside, access, and circulation facilities, the Recommended Development Concept includes the following improvements to accommodate future demand.

- Construct roadway turnoffs and on-site parking facilities to support fixed base operator and aircraft storage hangar developments discussed earlier
- Upgrade and extend Falcon Way

Recommended Land Uses

A primary goal of the Master Plan was to determine appropriate land use “envelopes” for accommodating the major Airport functions for the foreseeable future, including general aviation, Airport support, other aviation-related land uses, and nonaviation land uses.

Near-Term Aviation-Related Land Uses. As presented on Figure 4-2, an area is reserved for general aviation, and Airport support adjacent to, and west of the intersection of the two runways. The total area reserved for these uses is 96 acres. To facilitate the movement of ground vehicles, and satisfy runway approach and safety area requirements, it is recommended that Falcon Way be improved/upgraded.

Long-Term Aviation-Related Land Uses. As presented on Figure 4-2, approximately 125 acres to the north and east of Runway 12-30 are reserved for long-term airport-related development. It is intended that these areas be reserved for future taxiways, aircraft parking aprons, and airport-related facilities (additional general aviation, aviation maintenance, etc.) if demand conditions warrant such development beyond the 20-year planning period.

However, if market conditions warrant, portions of the area could potentially be used for commercial/industrial development to enhance revenue generation. Those areas shown in pink on Figure 4-2 are considered as secondary areas for development due to limitations caused by (a) underlying drainage canals and (b) the runway approach area.

Other Land Uses. Approximately 814 acres to the south and west of the runways are designated as biologically sensitive habitat.

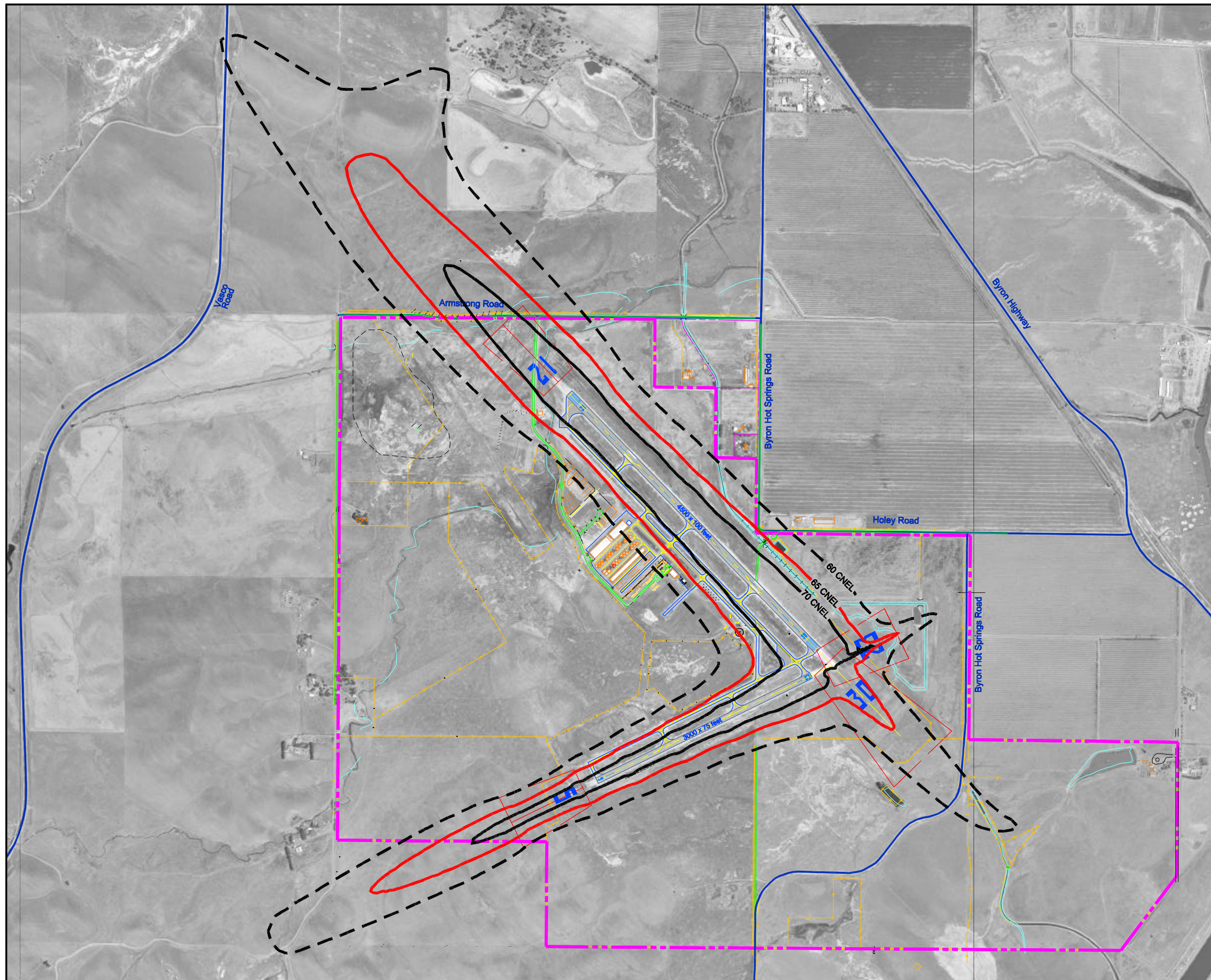
Aircraft Noise Exposure

The following discussion focuses on the general characteristics of aircraft noise and the methodologies used to analyze aircraft noise for Byron Airport. Aircraft noise in the Byron Airport environs area was analyzed using the FAA's Integrated Noise model (INM) in accordance with the methodology for preparing aircraft noise exposure maps (noise contours) contained in FAA Order 5050.4A. Noise contours were prepared for the base year—2003, and the 20-year planning horizon—2023. A discussion of the general characteristics of aircraft noise and the methodologies used to analyze aircraft noise in the Byron Airport environs is presented in Appendix C.

Existing (2003) Noise Exposure. Aircraft noise contours for the average day in 2003 at Byron Airport are illustrated on Figure 4-3. The mix of aircraft and the number of operations by aircraft type and time of day are presented in Appendix C. Based on FAA criteria for noise exposure, aircraft operations at Byron Airport are compatible with surrounding land uses, i.e., the 2003 CNEL 65 (Community Noise Equivalent Level—expressed in decibels) and higher noise exposure contours are generally located within the boundaries of the Airport, or on largely undeveloped land to the northwest and southwest of the Airport.

Future Noise Exposure. Effects of noise exposure associated with Master Plan development were addressed in the future contours. Noise contours for the average day at Byron Airport under the long-term planning scenario are presented on Figure 4-4. The mix of aircraft and the number of operations by aircraft type and time of day are presented in Appendix C. It was assumed for the purposes of determining aircraft noise exposure that no additional runway improvements would be constructed prior to the end of the 20-year planning period. The future CNEL 65 and higher noise exposure contours are generally located within the boundaries of the Airport, or on largely undeveloped land to the northwest and southwest of the Airport and as such Airport operations are compatible with surrounding land use based on FAA criteria.

The 2003 and the future Master Plan noise contours are essentially the same size. Inspection of the inputs to the INM and detailed analysis of the outputs show



LEGEND

- Airport boundary
- Off-airport road
- On-airport road

NOISE CONTOURS

- 60 CNEL
- 65 CNEL
- 70 CNEL

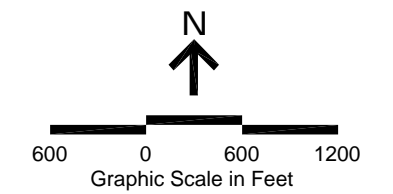
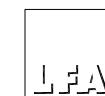


Figure 4-3

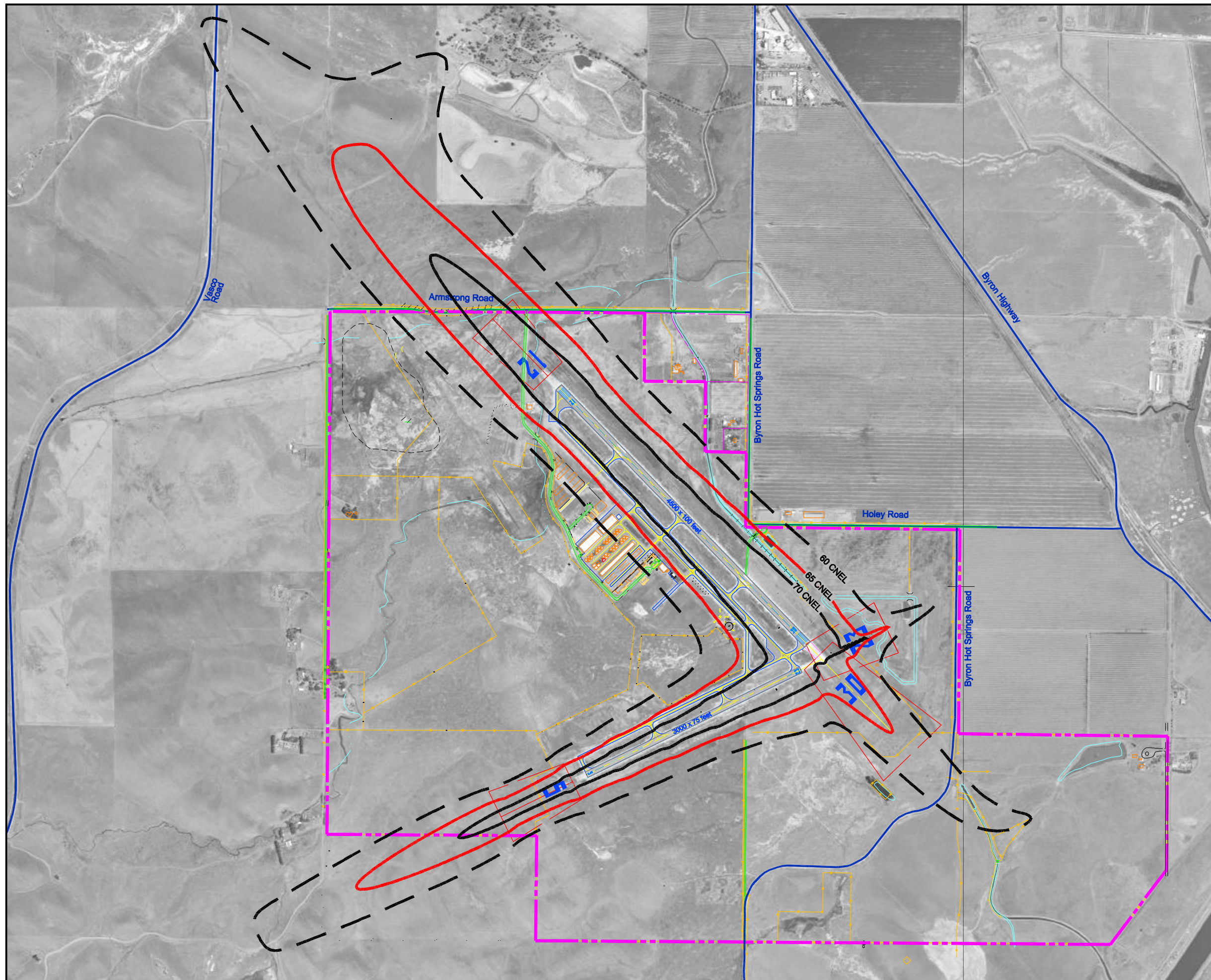
MASTER PLAN - NOISE CONTOURS
EXISTING CONDITIONS (2003)

Byron Airport
November 2004



LEIGH FISHER ASSOCIATES

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LEGEND

--- Airport boundary

— Off-airport road

— On-airport road

NOISE CONTOURS

— 60 CNEL

— 65 CNEL

— 70 CNEL

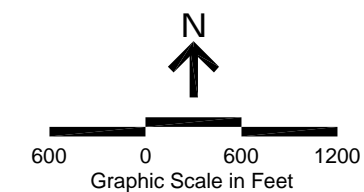


Figure 4-4

**MASTER PLAN - NOISE CONTOURS
FUTURE CONDITIONS (2023)**

Byron Airport
November 2004



LEIGH FISHER ASSOCIATES

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that the size of the noise contours are largely determined by the number of military jets aircraft in the fleet mix. These aircraft contribute over 90% of the noise exposure at any particular location in the airport environs. The number and type of these aircraft in the fleet mix are expected to remain relatively constant from 2003 to 2023 and hence there is little difference in the noise contours.

Compatible Land use

In accordance with the California State Aeronautics Act of 1967 (Public Utility Code Sections 21670 et seq), the Contra Costa County Airport Land Use Commission (ALUC) adopted an Airport Land Use Compatibility Plan (the ALUC Plan) and associated negative declaration in December 2000. The aircraft noise exposure contours for Byron Airport included in the ALUC Plan were prepared for two conditions—current activity (year 2000) and an ultimate level of activity that approximated the capacity of the airfield (with and without historic military jets). The contours contained in the ALUC Plan for the ultimate level of activity (with historic military jets)*, and which are shown on Figures 4-5, are smaller than the contours prepared as part of the Master Plan, even though the overall level of aircraft activity used in the ALUC contours was significantly greater than that of the Master Plan. The contribution of propeller-driven aircraft to the noise contours, even though they account for more than 90% of the overall landings and takeoffs, is relatively insignificant. Table 4-1 shows the levels of aircraft operations inherent in the Master Plan and the ALUC Plan noise contours, and Figure 4-6 compares the 65 CNEL contour from the ALUC Plan with the 65 CNEL contour from the Master Plan.

The primary reason for the Master Plan contours being greater than the ALUC contours is related to two assumptions made concerning the historic military jet activity. This is significant because of the noise emission characteristics of these aircraft—as noted earlier, they account for more than 90% of the noise exposure in the airport environs.

1. When the ALUC contours were prepared, the INM data base at that time contained a limited number of military aircraft, and the Lear 25 aircraft was chosen to represent the historic military jets. The INM data base has since been expanded to include additional military aircraft and the Master Plan noise contours were prepared using the A4 aircraft as a surrogate for the historic military jets. While the noise emission characteristics of the Lear 25 and the A4 are similar, the departure profile of the A4 is much lower than that of the Lear 25; hence the A4 will typically appear louder than the Lear 25.

*The ALUC Plan contours were developed assuming extension of Runway 12-30 to 6,000 feet and Runway 5-23 to 3,900 feet. The Master Plan assumes that these extensions would not be required until after the 20-year planning period.



LEGEND

- Airport boundary
- Off-airport road
- On-airport road

**NOISE CONTOURS - SHUTT MOEN ASSOCIATES
(APRIL 2000)**

- 60 CNEL
- 65 CNEL
- 70 CNEL

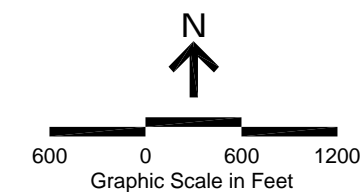


Figure 4-7

**ALUC PLAN - NOISE CONTOURS
FUTURE CONDITIONS**

Byron Airport
November 2004



LEIGH FISHER ASSOCIATES

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Table 4-1
ANNUAL AIRCRAFT OPERATIONS
 Byron Airport

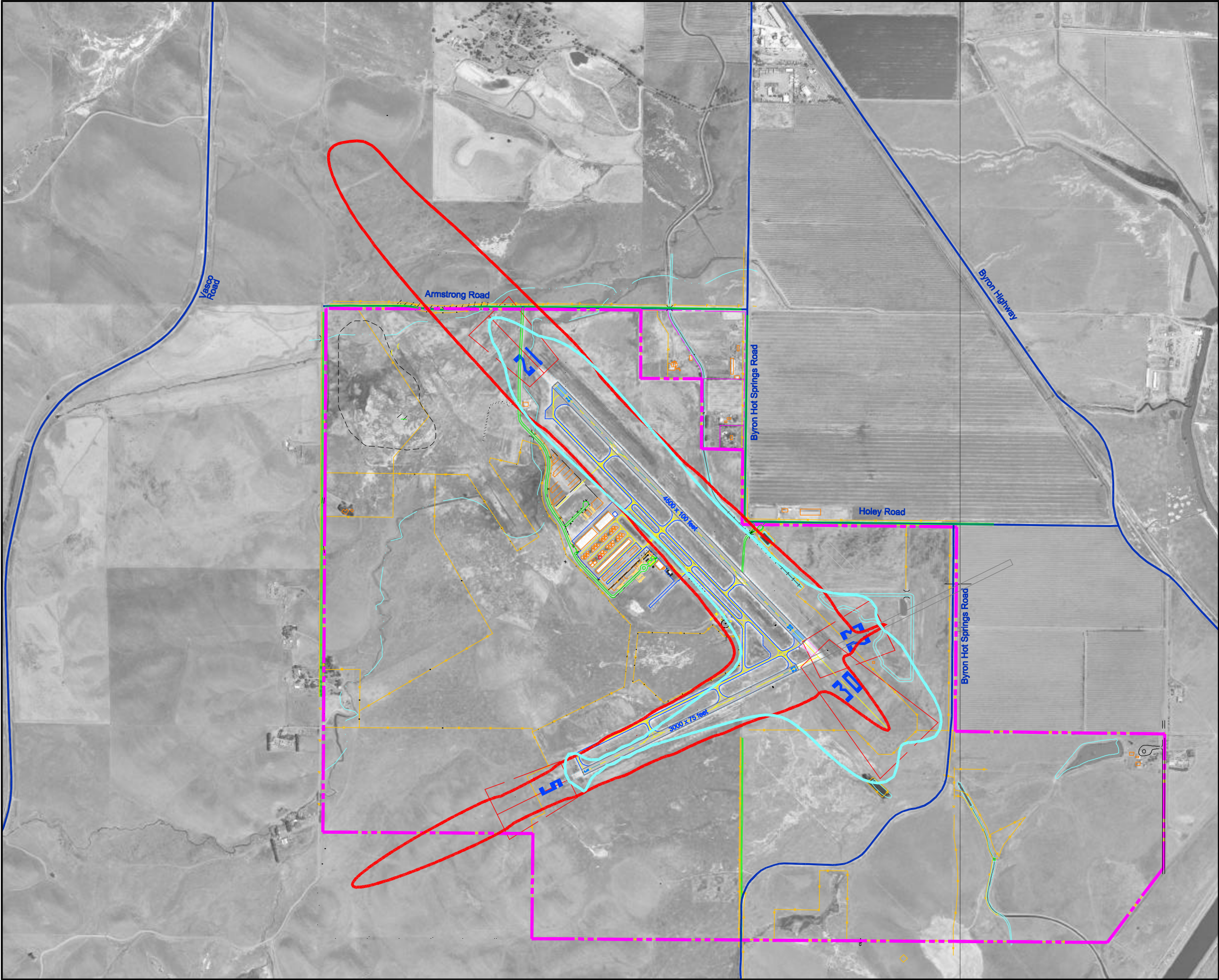
Aircraft type	Master Plan		ALUC Plan	
	2003	Future*	2000	Ultimate
Single engine-fixed	19,200	29,700	32,900	103,600
Single engine-variable pitch	8,800	13,500	14,000	44,400
Multiengine piston	1,200	2,100	3,600	12,000
Turboprop	4,400	10,100	200	3,000
Business jet	400	2,800	500	2,000
Historic/military jet	400	400	200	200
Glider	5,600	5,600	0	0
Helicopter	<u>0</u>	<u>0</u>	<u>9,100</u>	<u>25,000</u>
Total aircraft operations	40,000	64,200	60,500	190,200

*Long-term planning scenario.

Source: Leigh Fisher Associates, 2004.

2. The ALUC Plan contours assumed that there would be 200 annual operations (landings and takeoffs) by the historic military jets both for the year 2000 and in a future scenario. Based on a limited survey conducted in 2004, it was concluded that the activity level of the military jets was closer to 400 operations annually. Hence the Master Plan contours reflect the noise exposure resulting from twice as many historic military jets.

The combination of these two factors accounts for the differences between the ALUC Plan contours and the Master Plan contours.



LEGEND

- Airport boundary
- Off-airport road
- On-airport road

NOISE CONTOURS - MASTER PLAN (2023)

- 65 CNEL 65 CNEL - HIGH FORECAST

NOISE CONTOURS - ALUC PLAN

- 65 CNEL 65 CNEL

Figure 4-6

**NOISE CONTOURS COMPARISON
FUTURE CONDITIONS**

Byron Airport
November 2004



LEIGH FISHER ASSOCIATES

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FINANCIAL PLAN

The primary objective of the financial plan is to identify potential funding sources for the recommended capital improvement projects. Historically, capital improvements at Byron Airport have been funded with a combination of grants (federal and state) and County matching funds.

The capital expenditure plan summarizes capital improvements that would be required to support continued growth in “basic” activity at the Airport. Additional investments or property development may be warranted under a high end scenario; these potential additional investments are discussed in more detail in Chapter 5, Business Plan.

The capital expenditure plan summarizes projects that:

- Are consistent with the facilities requirements and recommended developments described earlier in this chapter,
- Would be required under any scenario to continue to support Airport activities,
- Represent mostly renovation or enhancement and extension of existing facilities,
- Would be largely federally funded and within County resources to develop, and
- Include longer-term potential utility development that would not necessarily be the exclusive responsibility of the Airport System

Table 4-2 summarizes the recommended capital improvement program for the near-term and long-term planning scenarios. In terms of generating new Airport development, priority should be given to projects that (a) “open up” access to Airport property (e.g., Falcon Way extension for a broader range of aircraft (e.g., widening taxiways). This comment notwithstanding, the other projects listed are important for various other reasons such as safety.

Table 4-2
CAPITAL IMPROVEMENT PROGRAM
 Byron Airport

Project	Estimated project cost	Funding	
		AIP	County
Near-term			
Utilities master plan	\$ 100,000	\$ 95,000	\$ 5,000
Pave pump station road	265,000	251,750	13,250
Falcon Way extension - Phase 1	616,000	585,200	30,800
Falcon Way extension - Phase 2	4,160,000	3,952,000	208,000
Falcon Way realignment	1,247,000	1,184,650	62,350
Land acquisition (a)	n.a.	n.a.	n.a.
Long-term			
Widen Taxiway A to 50 ft (b)	2,277,000	2,163,150	113,850
Widen Taxiway B to 50 ft (b)	942,000	894,900	47,100
Extend Taxiway B	1,186,000	1,126,700	59,300
Fire-fighting truck and storage shed	1,500,000	1,425,000	75,000
Utility extensions (c)	n.a.	n.a.	n.a.
Renovate Taxiway A	444,000	421,800	22,200
Renovate Taxiway B	246,000	233,700	12,300
Renovate Taxiway C	508,000	482,600	25,400
Renovate Runway 12-30	631,000	599,450	31,550
Renovate Runway 05-23	421,000	399,950	21,050
Total	\$14,543,000	\$13,815,850	\$727,150

(a) Land acquisition costs are not known at this time, but would be expected to be largely federally funded due to the purpose and need.

(b) To FAA ARC B-III criteria.

(c) Utility extensions are anticipated to be desirable during the 20-year planning period. However, it is not possible to estimate the cost, or the potential cost-sharing responsibility.

Source: Leigh Fisher Associates, June 2004.

As shown, 95% of the funding (about \$13.7 million) is anticipated to be provided by the federal Airport Improvement Program (AIP) and/or state funding, and the County would be expected to contribute the remaining 5% (about \$720,000) over the 20-year period. It is reasonable to expect that the County would have the funds, in combination with other sources such as CALTRANS grants, to provide for the matching contributions shown on Table 4-2.

There are two elements of the recommended capital program on Table 4-2 which do not have estimated costs or funding sources:

- Land Acquisition—Certain land acquisition would be desirable in order to include runway safety areas within the Airport boundaries, and prepare for a potential future runway extension. While it is not certain when this would be required, it is a priority in terms of making the Airport more attractive to potential users. It is not possible to estimate the cost of this land acquisition at this time. However, it is believed that FAA would support such land acquisition, and would therefore provide grant funding up to 95% of the cost.
- Utility Improvements—As the Airport is developed, it is likely that utility improvements would be required (electrical, water, sewer, etc.). With general economic development in the eastern portion of Contra Costa County, such improvements may be undertaken which would make it easier for the Airport to “tie into” the existing utility systems. It is not possible to anticipate at this time what improvements may be undertaken for general County growth, and what cost-sharing arrangements will be developed. However, this is included on the capital improvement program as an item that needs to be considered by the County in the longer-term development of the Airport.

The capital improvements identified in Table 4-2 would provide for continued Airport development, and enhance the potential for new revenue-generating activities at the Airport. The Business Plan presented in Chapter 5 evaluates the impact on Airport financial operations of investing in improvements in connection with other potential business development opportunities.